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URBAN AND REGIONAL LAND USE ANALYSIS:  
CARETS AND CENSUS CITIES EXPERIMENT PACKAGE

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MONTHLY PROGRESS REPORT

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Houston, Texas 77058

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Investigation No. 469

a. Overall status, including problem areas and significant progress to date:

a.1. CARETS--Land use analysis: Work is continuing on an expanded analysis of the accuracy of land use maps derived from S-190B data. The area and scale (1:100,000) of this analysis exactly conforms to that of the CARETS Washington mosaic sheet. This facilitates easy comparison of the Skylab data to the aircraft data. Also, the S-190A photograph, obtained simultaneously with the S-190B mentioned above, is being enlarged similarly and will be analyzed the same way. A consistent and comprehensive comparison of four data sets (aircraft, ERTS, S-190A and S-190B) will then be possible.

The outline for the final report has been expanded and modified to follow more closely some of the guidelines suggested by Rigdon Joosten in his letter of March 14.

a.2. CARETS--Land use climatology: In the period since the last report most of the work relating to the climatology experiment has been devoted to modifying and updating the gray-window model for calibrating Skylab data and the urban climate simulator. Figure 1\* is a colored version of the latest temperature map showing the Baltimore-Washington-Chesapeake Bay area. It was produced using the most recent refinements of Pease's modified gray-window model. Also completed during this period was a run of the Outcalt simulator using meteorological data obtained August 5, 1973.

a.3. Census Cities: Land use mapping and change detection in the Phoenix test site using Skylab 3, S-190B imagery have been completed for the 400 square kilometre area (sheet 700-400, Atlas of Urban and Regional Change) that includes areas of Scottsdale, Paradise Valley and parts of central and western Phoenix.

The Skylab 3 imagery was viewed with an 8x hand magnifier and also with a Teledyne Post Micro-Reader. Land use polygons were then plotted on a mylar overlay which had been fitted to a 1:100,000 scale Cibachrome enlargement of the S-190B image. Generally, all Level II (USGS Circular 671) urban and built-up categories could be identified from the Skylab imagery. It was possible to divide the transportation and residential categories into more precise designations, such as air, rail and highway transportation and single and multi-family residential. In addition, an institutional category, no longer specifically classified in USGS Circular 671, was employed

\*Retained at Geography Program, USGS, Reston, Virginia, and Principal Investigator's Management Office, Code TF-6, Johnson Space Center, Houston, Texas.

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in compiling the land use map due to the distinctive signatures of the large schools and medical complexes in the Phoenix area. Agricultural land could only be plotted at a Level I degree of detail. The distinction between orchards and other cropland, easily seen on high-altitude aerial photography, could not be clearly observed using the S-190B imagery. The plotting of various types of range and open land posed no particular problem to the interpreter.

Land use changes between 1970 and 1973 were delimited by overlaying the 1970 land use map derived from high-altitude aerial photography with the 1973 Skylab map, then drafting and coding the changes on a mylar overlay. The changes primarily involve large parcels, some measuring hundreds of hectares in size, of desert rangeland being built up in residential uses. Much of this change is occurring in northern Scottsdale and Paradise Valley. In Phoenix, a long, narrow strip of older residences could be seen to have been demolished, undoubtedly to make way for the construction of a new freeway around the central business district. The change polygons are currently being measured and coded and figures for them will appear in the final report to be submitted under this contract. Also, land use is being measured from the Skylab 3 map in census tracts where little or no change has been observed since 1970. By comparing these totals with those of the field evaluated 1970 land use map, it may be possible to arrive at a quantifiable comparison between the interpretability of S-190B imagery and high-altitude aircraft photography. The primary differences between the two sensors seem to be that small areas of commercial, institutional and multi-family housing uses cannot be as easily delimited from the S-190B imagery as from the aerial photography. Multi-family housing in particular is difficult to plot, especially smaller units on heavily vegetated plots. These areas were sometimes indistinguishable from older single-family housing tracts and were often misclassified as such.

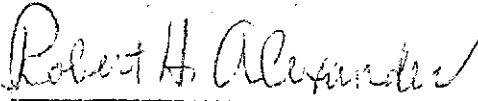
Work has begun on the Washington site and similar change detection and sensor comparability studies are to be carried out. Similar work is also being done for the San Francisco site and some results will hopefully become available for presentation at the NASA symposium in June.

- b. Recommendations concerning decision and/or actions required to ensure the attainment of the experiment's scientific objectives;  
No change.
- c. Expected accomplishments during the next report periods: No change.
- d. Significant results and their relationship to practical applications or operational problems: No change.

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- e. Summary outlook for the remaining effort to be performed: No change.
- f. Travel summary and plans: None.

Approved:



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